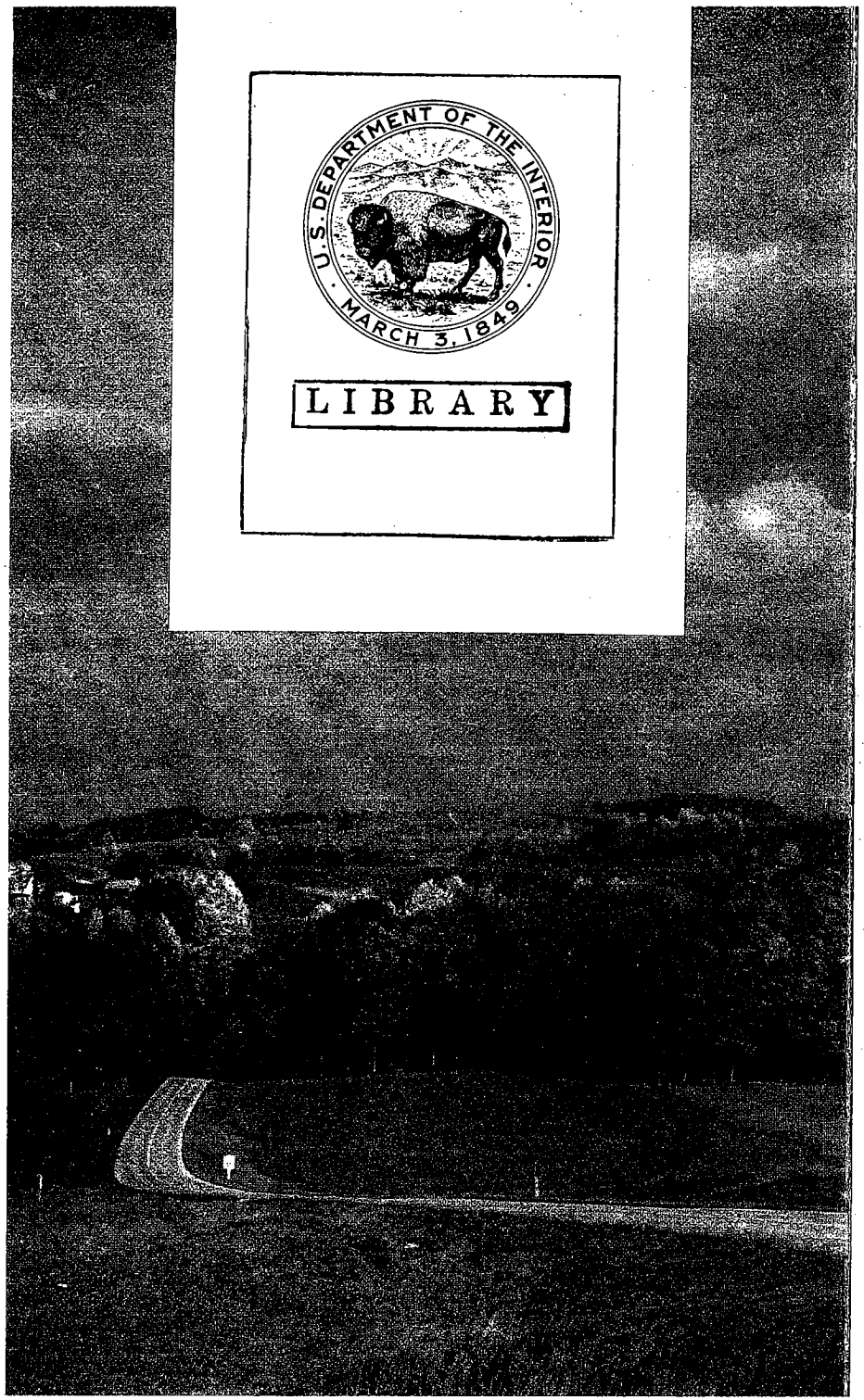
park road standards

U.S. DEPARTMENT OF THE INTERIOR • NATIONAL PARK SERVICE



park road standards

May 1968

U.S. DEPARTMENT OF THE INTERIOR • NATIONAL PARK SERVICE

Stewart L. Udall, *Secretary*

George B. Hartzog, Jr., *Director*

If the National Parks were like the rest of the countryside, you probably wouldn't be visiting one now. The National Parks are different, though, and one reason for this is that roadways, where they exist, are planned for leisurely sightseeing.

Park roads are designed with extreme care and located with a sensitive concern for the environment. They are often narrow, winding, and hilly. At times they are little more than trails. Bnt therein lies their appeal. These roads can take you close to America's most breathtaking places of beauty and history.

To experience a park at its best, try getting away from your car. Walk or, if conditions permit, go by horse or canoe to the more remote reaches. It is almost a truism that the slower you go the more you will see. The next best thing, for those who have neither time nor zest for roughing it, is a judicious use of park roads. Along these roads, you will find a world as varied as it is unhurried.

But park roads are for leisurely driving only. If you are in a hurry, you might do well to take another route now, and come back when you have more time.

George B. Hartzog, Jr., Director, National Park Service

From a greeting card given park visitors.

UNITED STATES
DEPARTMENT OF THE INTERIOR
National Park Service
Washington, D.C.

September 8, 1967

Memorandum

To: Messrs. Ansel Adams, Ira Gabrielson, Joe Penfold, Deputy Chief Scientist Linn, and Assistant Directors Everhart and Krueger

From: Director, National Park Service

Subject: Park Roads

I have discussed with each of you my concern that the National Park Service develop standards which will guide and control the construction and use of park roads. I deeply appreciate your willingness to undertake a study of this critical segment of park management.

In most of our parks the essential key to visitor use is the park road system. It is both means and end; it enables one visitor to reach his goal, for another it is the goal.

As in the case of the management of our park resources, we find that park boundaries are not barriers. The expanding network of Federal, state, and interstate highways increasingly designates park roads as connecting links, and demands appropriate standards. Some parks, traversed by a single road, are fated for inevitable strangulation.

I do not wish to restrict your field of enquiry, but I do suggest that most careful consideration be given to the following basic elements of the problem:

1. The basic purpose of park roads.
2. Guidelines for the speed limits, design, location and standards of park roads.
3. Criteria which will define consideration of transportation systems other than park roads.

It is my hope that your study will help provide us with answers to these basic questions: What is a *park* road? When, where, how and *why* do we build a park road? And under what circumstances do we consider adoption of other means of transportation?

I am asking Assistant Director Everhart to serve as Chairman of this group, and Assistant Director Krueger to serve as liaison officer with the Bureau of Public Roads. Mr. Lowell Bridwell, Federal Highway Administration, is being invited to designate a representative to work with you on the study.

I hope that you may be able to complete your work and submit your recommendations to me by December 1.

GEORGE B. HARTZOG, JR.

UNITED STATES
DEPARTMENT OF THE INTERIOR
National Park Service
Washington, D.C.

April 11, 1968

Memorandum

To: Secretary of the Interior
Through: Assistant Secretary, Fish and Wildlife and Parks

From: Director, National Park Service

Subject: Park Roads Standards Committee Report

You will recall that on September 8, 1967, I appointed a Committee of distinguished conservationists and members of my immediate staff to review the status of road construction in the National Parks, to define the purposes of such roads and to establish guidelines for their design and construction.

Serving on the Committee were: Joseph Penfold, Conservation Director, Izaak Walton League of America; Ira Gabrielson, President, Wildlife Management Institute; Ansel Adams, Photographer and NPS Collaborator; Charles Krueger, Assistant Director for Design and Construction; Robert Linn, Deputy Chief Scientist; and William C. Everhart, Assistant Director for Interpretation, who served as Chairman.

I believe this report will prove a significant contribution to National Park philosophy, and of enormous value to us at a time when road construction decisions constitute one of our most critical management problems.

If you are in agreement, I would like to make this report available for distribution to interested conservationists and park organizations, and to begin immediately implementation of its recommendations within the National Park Service.

GEORGE B. HARTZOG, JR.

Concurred:
STANLEY A. CAIN, Assistant Secretary, Fish and Wildlife & Parks

Approved:
STEWART L. UDALL, Secretary of the Interior

UNITED STATES
DEPARTMENT OF THE INTERIOR
National Park Service
Washington, D.C.

April 11, 1968

Memorandum

To: Director, National Park Service

From: Chairman, Park Road Standards Committee

Subject: Final Report

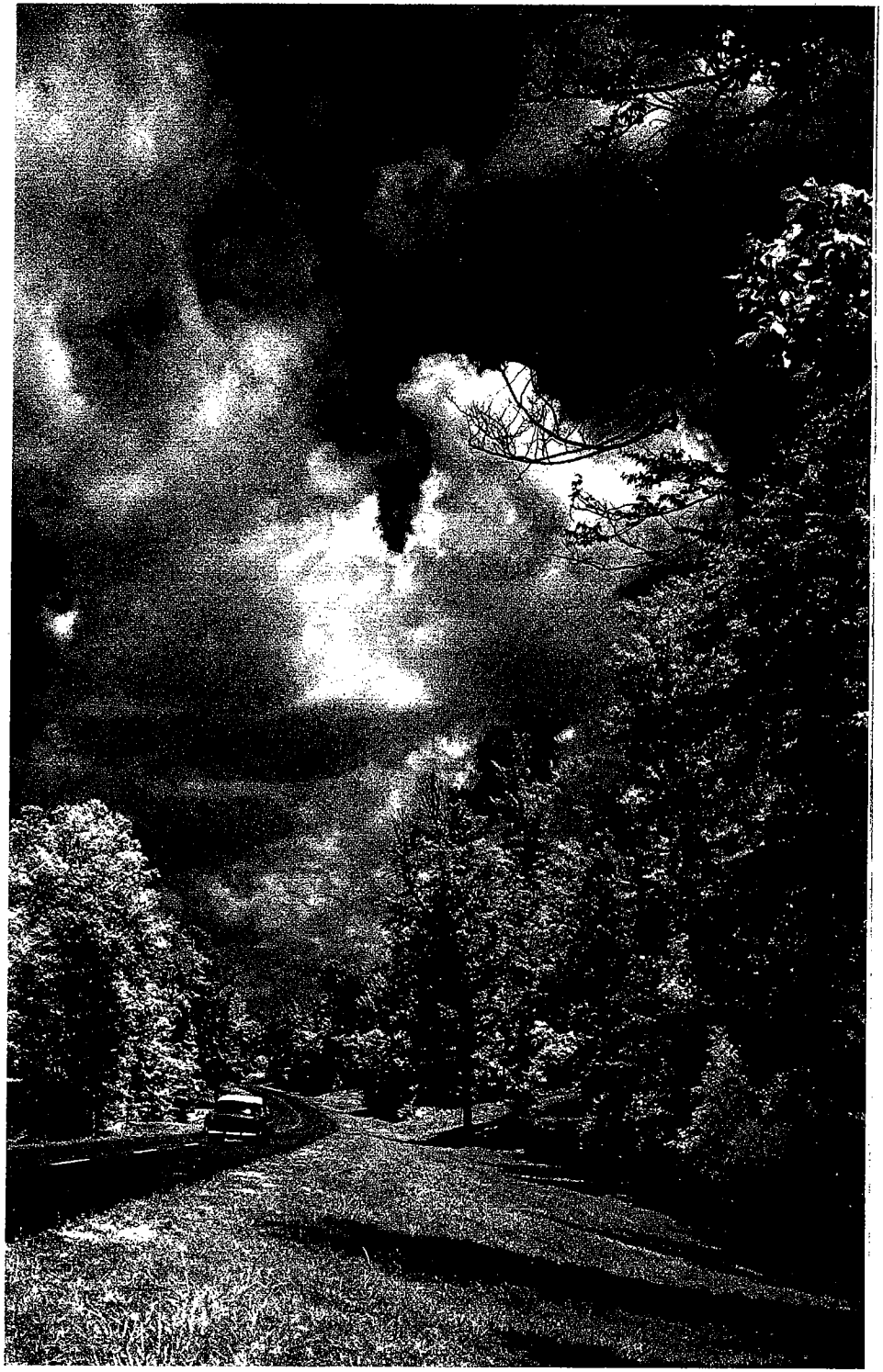
On September 8, 1967, as a result of your deep concern "that the National Park Service develop standards which will guide and control the construction and use of park roads," you appointed a Committee on Park Road Standards: Joseph Penfold, Conservation Director, Izaak Walton League of America; Ira Gabrielson, President, Wildlife Management Institute; Ansel Adams, Photographer and NPS Collaborator; and from the National Park Service, Charles E. Krueger, Assistant Director, Design & Construction; Robert Linn, Deputy Chief Scientist; and as Chairman, William C. Everhart, Assistant Director, Interpretation.

The Committee was asked to review the status of road construction, to define the purposes of such roads, and to establish guidelines for their design and construction. The report which follows expresses our conviction on the philosophy which should guide those responsible for policy decisions, as well as those who have design and construction responsibility.

In the quest to insure that National Parks remain places to which people go for a special kind of experience, rather than merely places for viewing famous natural wonders, the park road system is an essential key.

It is our hope that this report will be of help to you in a most difficult and complex area of park management. The opportunity to serve on the Committee, we believe, was a distinct honor.

WILLIAM C. EVERHART
Assistant Director, Interpretation



The Purpose of Park Roads

Among all public preserves, those of the National Park System are distinguished by the quality of their natural, historical, and recreational resources—dedicated and set aside unimpaired for the benefit and enjoyment of the people.

These national parklands—mountains, deserts, seashores, lakes, forests—increasingly have become places of escape from the monotony and frustrations of urban life. And the astounding mobility of vacation travelers has brought the most remote wilderness areas within reach of millions.

Major destination points for this seasonal migration are the well-known National Parks, which are now asked to serve a volume of visitors that seemed inconceivable as recently as 10 years ago.

In 1965, there were 61 million park visits; in 1966, 103 million; in 1977, the total will be more than 300 million.

This flood of park users represent either a profound threat to park values—or an extraordinary opportunity to make those values a more meaningful part of this nation's cultural inheritance.

The single abiding purpose of National Parks is to bring man and his environment into closer harmony. It is thus the *quality* of the park experience—and not the statistics of travel—which must be the primary concern.

Full enjoyment of a National Park visit is remarkably dependent on its being a leisurely experience, whether by automobile or on foot. The distinctive character of the park road plays a major role in setting this essential unhurried pace.

The design and location of park roads must be in accordance with the philosophy that *how* a person views the park can be as significant as *what* he sees, thereby insuring that National Parks remain places to which people go for a special kind of experience, rather than merely places to view famous scenic wonders.

Since 1915, when the early motorists in Yellowstone were no longer required to chain their cars to logs and turn over their keys to the park superintendent, visitor activities in the parks have been geared to the automobile.

"To experience a park at its best, try getting away from your car." Yellowstone National Park, Wyo.-Mont.-Idaho.

The character and pace of use of this original jeep road to Wetherill Mesa will be retained. Mesa Verde National Park, Colo.

Although, by an accident of history, the National Park concept reached its development stage at about the same time as did the automobile, there is no everlasting and indissoluble relationship between the two.

But in some ways, the National Parks stand at the same crossroads as do the American cities—some of which seem on the verge of choking on their automobiles. Just as noise, congestion, and pollution threaten the quality of urban life, they have begun to erode the quality of the park experience.

Many park roads are now congested, particularly around points of great interest; others have a predictably brief grace time.

There is no reason to expect that the construction of a new park road, by itself, will always relieve this congestion.

The effective size and capacity of the parks is diminished or expanded by the means of access. Paul Brooks put it this way:

> If you are in a canoe traveling at three miles an hour, the lake on which you are paddling is ten times as long and ten times as broad as it is to the man in a speedboat going thirty—every road that replaces a footpath, every outboard motor that replaces a canoe paddle, shrinks the area of the park.

In many locations it is impossible to construct roads—of whatever standard —without damaging, enduring scars and obstructing the natural movement of wildlife. While many park administrators and conservationists in the past have been unalterably opposed to replacing roads with tramways, funiculars, and other such developments, in many cases these would have done far less permanent damage to the park environment.

The Service is presently conducting extensive research into the capabilities, cost, and possible effects on the terrain and equilibrium of nature, of many different methods of transporting people, including tramways, monorails, rail conveyor systems, buses, helicopters, and hydrofoils. Research on this technology—and the development of pilot programs—should be given high priority.

These forms of transportation are adaptable to park use, and many can be built without damaging resources or even tree cutting. They can also provide experiences for visitors otherwise unobtainable. The intrusiveness of roads—their cuts and fills, traffic noise, and the consequent ecological barrier—can often be avoided completely.

When the Service is faced with a choice between creating a severe road scar in order to bring visitors to a destination point, or requiring visitors to walk a considerable distance—or considering an alternate transportation system—the decision should be against the road scar.

It is quite possible that, at this point in the history of National Parks, new roads should be considered the last resort in seeking solutions to park access.

In the older parks, the road systems have been established, and solutions to circulation problems must start with this situation. Desirable solutions do exist: speed limits can be reduced; two-way roads may convert into a total or partial one-way system; existing administrative or service roads may provide

On the old towpath. Chesapeake and Ohio Canal National Monument, Md.-W. Va.

Over-snow vehicles are gaining in popularity. Yellowstone National Park, Wyo.-Mont.-Idaho.

for leisurely one-way nature roads or other uses; automobiles may be limited to certain portions of a park, and bus, minitrain, or other transportation furnished.

The search for new solutions is imperative, and must not be crippled by those well worn shibboleths dealing with human behavior: "people won't walk," "they won't leave their cars," "they won't accept restrictions." The good humor of those who stood in the long, long lines at EXPO 67, and the acceptance of an advance reservation system for guided tours of the Mesa Verde cliff dwellings in 1967, effectively contradict such assertions.

Inevitably, if the park experience is to maintain its distinctive quality, the numbers of people and their methods of access and circulation will necessarily have to be more closely controlled.

Park roads cannot accommodate all types of vehicles. While the travel industry continues to develop new kinds of mobile camping vehicles, the Service must not be obligated to construct roads or to manage traffic in order that modern transportation technology can be accommodated. The development of parking areas for trailers at park entrances and the exclusion of these vehicles from those park roads not capable of handling them are appropriate solutions.

Existing park roads should be analyzed to determine the size and type of vehicles that can be accommodated. Vehicles exceeding these standards must be excluded, rather than reconstructing the roads to ever higher standards.

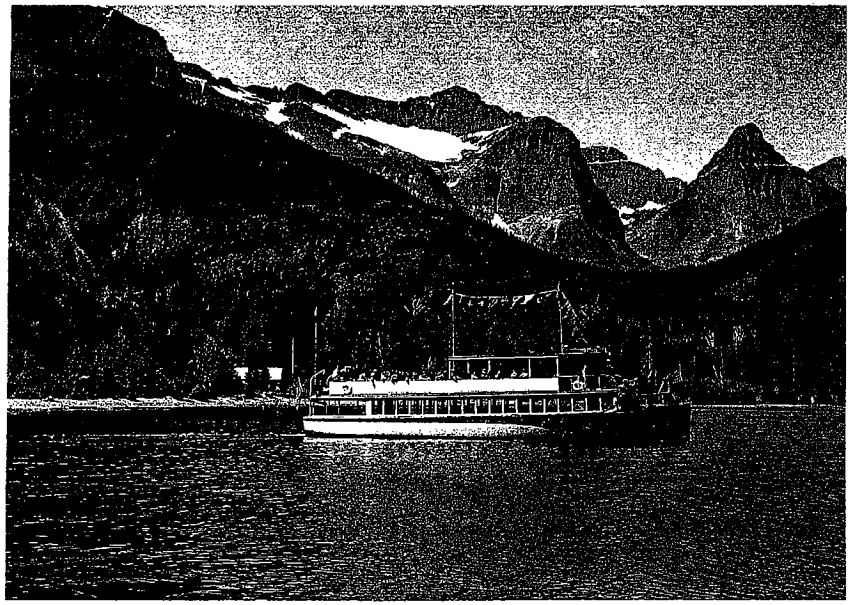
In this era of enormously increasing vacation traffic, it must be assumed that those who visit the National Parks do so for the purpose of enjoying a unique experience, and are therefore willing to accept necessary restrictions, including those regulating numbers of people and their means of travel. Such regulations, as necessary, may deepen the awareness of visitors that they are truly in places of special importance.

Today the facts are these: unless an open-end road-construction program were to be carried out, the National Parks cannot indefinitely accommodate every person who wants to drive an automobile without restriction through a National Park.

This does not constitute a value judgment that those who seek a hurried trip through a park are less desirable visitors and should be excluded. Obviously, many who first visited a National Park in haste have returned to enjoy leisurely visits.

The Service needs to communicate widely that parks are for leisurely travel and that park roads are purposely designed for low speeds. This information should appear on oil company road maps and in automobile association literature, as well as NPS signs and publications.

People need also to appreciate that the purposes of park roads are completely different from those of the Federal and State systems. Park roads are not continuations of the State and Federal network. They should neither be designed—nor designated—to serve as connecting links. Motorists should not be routed through park roads to reach ultimate destinations.



"Every opportunity should be taken to encourage the safe use of waterways for access to park features." Waterton-Glacier International Peace Park, Mont.-Alberta.

"The decision should be against the road scar." Visitors must walk into the fort area at Fort Bowie National Historic Site, Ariz.

Within parks, no road or other circulation system should be designed simply as a connecting device to link points of interest. Every segment of every park road should relate to the environment through which it passes in a meaningful way, and should, to the extent possible, constitute an enjoyable and informative experience in itself.

For this reason long tangents which encourage faster speeds—and fleeting views of "kinetic scenery"—should always be avoided. The horizontal and vertical alinement should respect the terrain, so that the road is laid lightly onto the land. In deciding upon road locations, maximum advantage should be taken of interpretive and scenic values.

And, the design and location of the road should constantly encourage people to leave their automobiles to more thoroughly experience the park, by providing pullouts, parking, scenic overlooks, and trail connections.

Every opportunity should be taken also to encourage the safe use of waterways for access to park features. Few resources lend themselves so well to human use, and sustained penetration of natural areas, without serious impairment of natural values. Careful consideration must be given to regulation of motorboats, for sound pollution is as destructive to the values of natural waterways as are water pollution and waterfront buildings.

The purposes of roads differ in the natural, historical, and recreational areas of the National Park System, and design standards must recognize these differences. However, the damaging effects of road construction are generally as disruptive to the historical scene as they are to the natural setting —and the effects of roads on integral values of natural features in recreational areas must be fully considered.

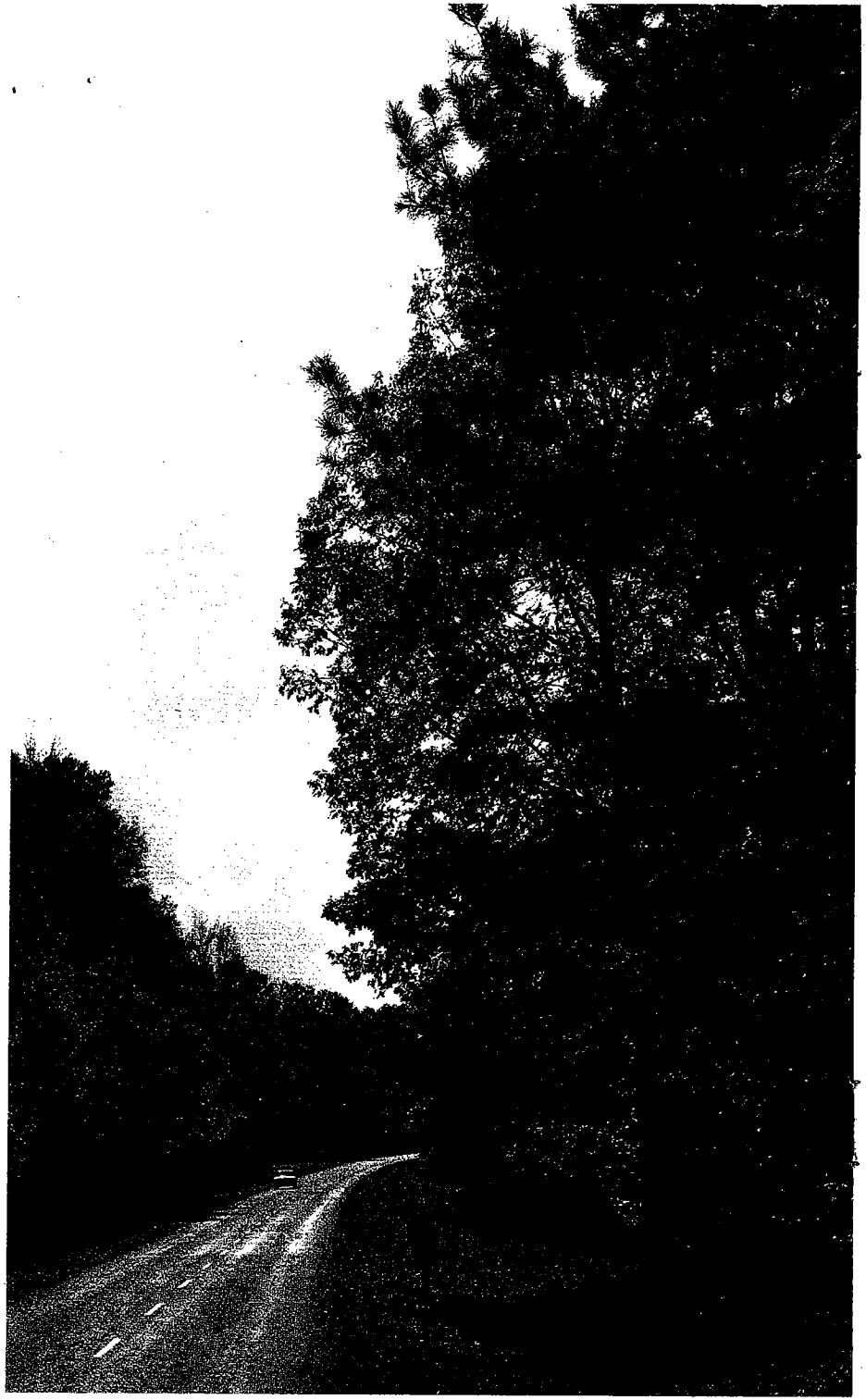
In summary, a road should not be considered until a most thorough and thoughtful determination has been made of the most meaningful way in which people can experience the park.

APPROVAL OF DESIGN AND CONSTRUCTION

To insure that all National Park roads, or other circulation systems, are in harmony with fundamental park purposes, the following considerations must precede approval of design and construction:

1. A professional ecological determination must be made that the resulting effects on park values—including such aspects as wildlife habitat and mobility, drainage, stream flow, and the climatic effects of paved areas—will be minimal.
2. A professional determination must be made that the means of transportation and its location will provide maximum opportunity for visitor enjoyment and appreciation of park resources. The encouragement of such activities as viewing wildlife, photography, and hiking and nature walks will be influential in determining actual locations and standards.

A park road is not one that merely conforms to standards of technical road-building excellence. Preserving the integrity of the landscape, respecting ecological processes, insuring a fully rewarding visitor experience—these are the elements which dictate the means of visitor access and the development of design standards.



Design Standards

Five types of park roads exist: major, minor, special-purpose, interpretive (motor nature), administrative, and parkways.

Park roads, of these varying types, are built over terrain and under climatic conditions which approach the infinite in variety: On high mountain ridges in rugged terrain—along seashores and lakeshores—from the permafrost of Alaska to the deserts of the Southwest and the Everglades of Florida—over lava fields and through rain forests. Each road problem must be influenced by the specific local conditions of climate and topography, as well as ecological and interpretive factors.

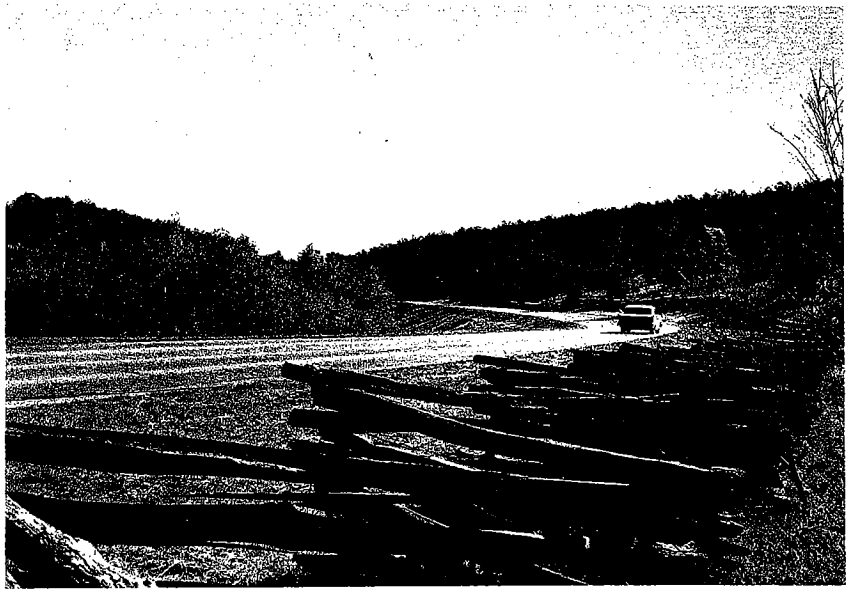
This requires maximum flexibility in working out design features, which does not permit the establishment of arbitrary standards. Instead, the following guidelines are provided, within which necessary flexibility can be reached.

Design

An esthetically pleasing road is one which lies lightly upon the land utilizing natural support wherever possible. Moreover, heavy cuts and fills must be avoided. In effect, the road is molded to the terrain through which and upon which it is passing. Monotony is avoided, and maximum advantage taken of park values, by eliminating long tangents, by changes in elevation, by developing viewpoints and overlooks, as well as providing close-range views of local scenes. The road should, in fact, strive to maintain a continuing sense of intimacy with the countryside through which it is passing.

In forested terrain, clearing limits should be carefully controlled and selective cutting should be used to produce variation and indentation in the tree line. Retaining walls can reduce the height and extent of cut-and-fill slopes. In heavy mountainous terrain and under certain other conditions, serious consideration should be given to the use of trestles or bridges, tunnels, and half-viaduct sections to reduce scarring and permit movement of wildlife.

Road and bridge conform to the contour of the land in Sequoia National Park, Calif.



"The objective should be a natural and attractive setting." Blue Ridge Parkway, Va.-N.C.-Tenn.

Ditches and Slopes

The immediate roadside setting must exemplify the highest design quality in terms of blending ditches and shoulders and related tree and other vegetative cover. The objective should be a natural and attractive setting. To minimize maintenance problems, cut-and-fill slopes should be rounded, warped at the ends for transition, and properly seeded, fertilized, and mulched for early recovery and to control erosion.

Roadway Structures

The design of all structures—bridges, tunnel portals, grade-separation structures, and retaining walls—should be aesthetically pleasing as well as functional and easily maintained.

Engineering

Working within the guidelines established by scientific, interpretive, and aesthetic considerations, the engineer is responsible for providing expert engineering advice in road planning, and for constructing a road which is safe, has adequate foundation and drainage, and will require a minimum of maintenance. Engineering also includes thorough soil analysis by borings and other necessary geological determinations to assure roadbed stability.

Vertical Alinement

On parkways, major and minor park roads, and administrative two-way roads, grades of 7 percent are normally a desirable maximum, but grades of 8, 9, or even 10 percent should be considered for relatively short distances to avoid excessive cuts and fills or to reach desirable points of interest. On one-way roads where vertical sight distance is not a problem, these requirements can be further relaxed and a more undulating gradeline used to reduce cuts and fills to a minimum and to provide for leisurely driving.

Design Speed

The maximum degree of curvature permitted on a road is generally expressed in terms of "design speed" which represents the maximum speed at which a curve can be safely driven. Thus a road with a 25-mile-per-hour design speed has no curves which cannot be safely negotiated at 25 miles per hour.

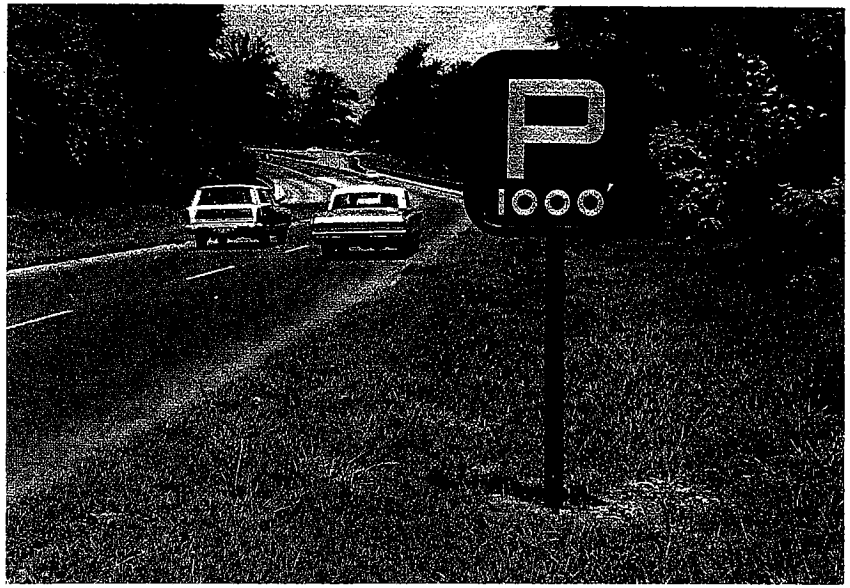
Except in special cases approved by the Director, major and minor roads in natural and historical areas should have a design speed not to exceed 25 miles per hour, parkways and major roads in recreation areas, 45 miles per hour, and special-purpose or interpretive roads, 15 miles per hour.

Rigidity in laying out horizontal alinement to a uniform design speed should be avoided, by reducing the design speed to fit the terrain, with the proviso that drastic reductions in design speed should be properly signed for the safety of the driver.

Roadway Widths

Roadway width constitutes the width of the final completed roadway extending from edge of shoulder to edge of shoulder. A road having 22 feet of pavement and 3-foot shoulders would have a roadway width of 28 feet.

"Roads are often narrow, winding, and hilly." Capitol Reef National Monument, Utah.



Quality and design of road signs contribute to visitor experience.

Selection of the proper roadway width is made on the basis of numerous factors including existing and anticipated traffic volumes, safety, type of terrain, engineering requirements, design speed—and the purpose for which the road is being built. Pavement widths that are too narrow can defeat their own function.

The extreme outer edge of the pavement, the weakest point, carries the wheel load and tends to break down and create a raveled edge which requires constant patching and maintenance.

The width of shoulders is equally important. Shoulders which are too narrow do not provide good support for the edge of the pavement nor adequate space for pull-off in case of emergency.

Except as may be approved by the Director, roadway widths in natural areas shall be as follows:

1. Major two-way park roads should have a pavement not to exceed 22 feet plus shoulders not to exceed 3 feet.
2. Minor two-way park roads should have a pavement width not to exceed 20 feet with shoulders not to exceed 3 feet.
3. Major, minor, and special-purpose one-way park roads should have a pavement width not to exceed 12 feet with shoulders not to exceed 2 feet.
4. Interpretive (motor nature) roads should have an overall width not in excess of 14 feet.
5. Administrative roads should be of the minimum width necessary to serve the purpose of the road. In no event may they exceed the guidelines for minor park roads.
6. Where guardrails or guideposts are required for reasons of safety, two additional feet of shoulder will be permitted.

The foregoing standards will not permit certain oversize vehicles to use such roads safely, and such vehicles should be prohibited by regulation.

Recreation Areas

As a rule, two-way parkways and two-way major roads in recreation areas serve functions broader than roads in natural areas, such as driving for pleasure and providing access for recreational vehicles and boats. Accordingly, where necessary to accommodate such use, roadway widths for two-way roads in recreation areas may be 24 feet of pavement and shoulders not to exceed 4 feet. Roadway widths in excess of the foregoing should be approved by the Director. In those recreation areas where the road is part of a through highway, no higher standard should be approved within the area than exists for the roadway outside the area.

Other type roads (minor two-way roads, interpretive and administrative roads) in recreation areas should be of widths specified for similar roads in natural areas.

Parking

Parking areas, either within the system or at terminal points, are an integral part of the circulation system. The placement of parking areas where they intrude, by sight or sound, on significant features must be avoided. Moreover, the size of parking areas should be limited to the greatest extent pos-

sible for effective operation. Where large parking areas are necessary they should be broken up with plantings and screenings, if possible.

Signs

Roadside signing, whether regulatory, informational, or interpretive, is an integral part of the visitor experience, as well as road design. Care should be exercised to insure that the quality and design of all signing enhances the visitor experience.

Road Surfaces and Materials

Wherever appropriate, the color of materials used in road construction will be chosen to harmonize with the general character of the landscape. Chips used for periodic sealing and repair should be selected from appropriate rock material sources. The above is equally applicable to parking areas.

Trail Surfaces and Materials

A particular effort shall be made to avoid the construction of black top trails in sensitive areas such as Indian ruins and natural features, and the above guidelines for road materials will apply to trails. Elevated boardwalks, such as the Anhinga Trail, are often effective solutions, and methods of stabilizing soils should be investigated.

Borrow Pits

Only when economic factors make it greatly impractical will borrow pits be created in the parks, or present pits further utilized, unless located in washes or other places where natural factors will eradicate the scar.

One-way Roads

In general, the philosophy should be followed that the primary park purposes of preservation, enjoyment, and interpretation are collectively served better by one-way roads than by two-way roads (major and minor park roads and parkways). Accordingly, one-way roads should be constructed in preference to two-way roads wherever practicable, when in keeping with the purpose of the road and these guidelines.

Interpretive (Motor Nature) Roads

An often overlooked opportunity to disperse the traffic load and to increase visitor enjoyment is to convert existing roadbeds—such as abandoned roads and railroads, fire roads, and administrative roads—into interpretive roads or motor nature trails. Their use for this purpose is encouraged. These low-speed, often one-way roads, with ample parking, viewing, and trail opportunities, encourage visitors to explore the scenery and features at a leisurely pace.

Alternate Methods of Transportation

The Service must avail itself of an up-to-date, continuing analysis of all potentially useful modes of transportation. Feasible alternatives to road transportation should receive experimentation in parks or recreation areas in which serious circulation problems now exist or in which access has not yet been provided.